

What is claimed is:

1. A programmable mass flow controller comprising:
 - an input configured to receive an input signal;
 - an output configured to provide an output signal;
 - a communication port configured to receive program instructions including instructions relating to the programmed configuration of the mass flow controller, and programming data, wherein the communication port also is configured to receive data relating to parameters associated with at least one of two modes of operation of the mass flow controller;
 - wherein the at least one of two modes of operation of the mass flow controller includes a pulse gas delivery mode of operation, wherein the input signal is operative as a pulse trigger signal for operating the mass flow controller so as to deliver a sequence of pulses of gas in the pulse gas delivery mode of operation in accordance with a recipe including a profile and sequence of timed pulses;
 - a flow sensor configured to sense the flow of gas through the mass flow controller;
 - a control valve configured to control the flow of gas through the mass flow controller;
 - memory configured and arranged to receive programming data determining the programmed configuration of the mass flow controller as either a digital or analog configuration; and
 - a processor/controller is configured and arranged to operate the mass flow controller in accordance with the programmed configuration.
2. A mass flow controller according to claim 1, wherein the programmed digital configuration enables the mass flow controller to respond to digital signals applied to the input.
3. A mass flow controller according to claim 1, wherein the programmed analog configuration enables the mass flow controller to respond to analog signals applied to the input.

4. A mass flow controller according to claim 1, wherein the at least one of two modes of operation of the mass flow controller includes a classic mass flow controller mode of operation, wherein the input signal represents the flow setpoint for operating the mass flow controller in the classic mass flow controller mode of operation.
5. A mass flow controller according to 1, wherein the communication port is configured to receive parameters for pulse gas delivery.
6. A mass flow controller according to claim 5, wherein the parameters are associated with a mole delivery mode of gas pulse delivery operation.
7. A mass flow controller according to claim 6, wherein the parameters include the pulse-on period, pulse-off period, the mole delivery setpoint, and the number of pulses.
8. A mass flow controller according to claim 1, further including a digital communication interface that includes the digital communication port.
9. A mass flow controller according to claim 1, further including an analog communication interface having an analog input pin for forming the input and receiving an analog trigger signal input, and an analog output pin for forming the output and providing an analog synchronization signal output.
10. A mass flow controller according to claim 1, further including both a digital communication interface and an analog communication interface.
11. A mass flow controller according to claim 1, wherein the output signal is operative as a synchronization signal for use in synchronizing the timing of the delivery of the sequence of pulses with the operation of a second device.
12. A mass flow controller according to claim 11, wherein the second device is a second mass flow controller.
13. A mass flow controller according to claim 12, wherein the synchronization signal is a trigger signal input to the second mass flow controller.
14. A mass flow controller according to claim 11, wherein the second device is an RF power generator.
15. A mass flow controller according to claim 11, wherein the second device is a pressure controller.

16. A mass flow controller according to claim 11, wherein the synchronization signal is generated prior to the completion of the delivery of the sequence of pulses.
17. A mass flow controller according to claim 11, wherein the synchronization signal is generated simultaneously with the completion of the delivery of the sequence of pulses.
18. A mass flow controller according to claim 11, wherein the synchronization signal is generated after the completion of the delivery of the sequence of pulses by a predetermined delay.
19. A mass flow controller according to claim 1, wherein the pulse trigger signal is a digital signal.
20. A mass flow controller according to claim 1, wherein the pulse trigger signal is an analog signal.
21. A mass flow controller according to claim 1, wherein the output signal is a TTL synchronization output signal for use by another device.
22. A mass flow controller according to claim 1, wherein the communication port is capable of receiving both at least one digital signal input and at least one analog signal input, and wherein the communication port is capable of providing both at least one digital signal output and at least one analog signal output.